IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

CYWEE GROUP LTD., ***Plaintiff,*** **v.** **SAMSUNG ELECTRONICS CO., LTD. AND SAMSUNG ELECTRONICS AMERICA, INC.** ***Defendants.***	**CASE NO. 2:17-cv-00140-RWS-RSP** **JURY TRIAL DEMANDED**

PLAINTIFF CYWEE GROUP LTD'S OPENING CLAIM CONSTRUCTION BRIEF

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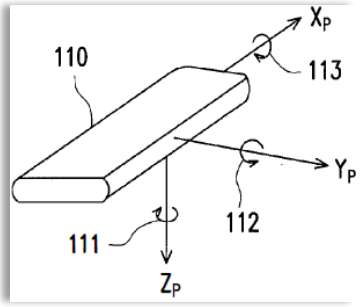
A	U.S. Patent No. 8,441,438
B	U.S. Patent No. 8,552,978
C	Declaration of M. Ray Mercer, dated January 26, 2018
D	Claim Construction Order (Dkt. 70) in *CyWee Group Ltd, v. Apple Inc.*, No. 14-cv-01853-HSG (N.D. Cal.)
E	Excerpt from Noureldin et. al al., Fundamentals of Inertial Navigation, Satellite-based Positioning and their Integration, Springer-Verlag Berlin, Heidelberg, 2013

Plaintiff, CyWee Group Ltd. ("CyWee"), submits its opening claim construction brief which includes proper constructions and related argument for the disputed terms of U.S. Patent No. 8,441,438 ("the '438 patent") and U.S. Patent No. 8,552,978 ("the '978 patent").

I. GENERAL TECHNICAL BACKGROUND

The '438 and '978 patents describe and claim inventions for tracking the motion of a portable electronic device in 3D space and compensating for accumulated errors. *See, e.g.*, '438 patent 1:17-26; '978 patent 1:22-27. Changes in orientation may then be transformed and shown as a movement pattern on an external display, or on the display of the portable electronic device itself. *See* '438 patent 1:17-52, 3:52-57, Figs. 5, 6; '978 patent 1:22-27, 7:5-18.

Motion sensors detect and measure accelerations, rotations, or magnetisms, which generate data representing movement, shaking, or tilting of a device along three perpendicular reference axes (X, Y, and Z) of a 3D space. For example, in the excerpt from Figure 1 shown on the right yaw angle 111 represents rotation of pointing device 110 about the Z_P axis; pitch angle 112 represents rotation of pointing device 110 about the Y_P axis; and roll angle 113 represents the rotation of pointing device 110 about the X_P axis. '438 patent 1:65 –2:2.



There are different types of motion sensors, including accelerometers, gyroscopes, and magnetometers. Accelerometers measure accelerations. Airbags use accelerometers, such that the airbag is triggered by sudden deceleration. Gyroscopes measure rotation rates or angular velocities. Magnetometers measure magnetisms, including the strength of a magnetic field along a particular direction. Sensors typically provide measurements along a single direction. To accurately measure motions along an arbitrary axis, three like sensors (i.e. three accelerometers) may be grouped together. Such a sensor set is generally referred to as a 3-axis sensor.

Each type of sensor is subject to inaccuracies. For example, a gyroscope has a small, added offset or bias, that may accumulate over time and lead to large drift error. Similarly, magnetometers are subject to interference from natural and manmade sources.

To incorporate data from multiple sensors and compensate for errors, both patents disclose sensor fusion technology. The ’438 patent discloses an enhanced 6-axis sensor fusion technology for calculating orientation (including tilting angles along all three spatial axes) by using measurements from a 3-axis accelerometer and a 3-axis gyroscope; furthermore the patented invention can eliminate or reduce errors associated with those sensors. ’438 patent 4:6-30. The ’978 patent discloses a similar 9-axis enhanced sensor fusion technology for calculating orientation and transforming the movement of the device to a display. ’978 patent 4:15-44. Unlike the ’438 patent, the ’978 patent requires a magnetometer. *Id*. Claim 1, 10.

Orientation information returned by the claimed inventions of the ’438 and ’978 patents has many uses, particularly for mobile cellular devices, such as navigation, gaming, and augmented/virtual reality applications.

II. LEGAL STANDARDS

A. Claim Construction

Claim construction is the first step in both patent infringement and invalidity analyses. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976-78 (Fed. Cir. 1995). As a result, “[i]t has been an inviolate rule that patent claims are construed the same way for validity and for infringement.” *Abbott Labs. v. Sandoz, Inc.*, 566 F.3d 1282, 1317 (Fed. Cir. 2009). Claim construction is a question of law that must be resolved by the Court. *Markman*, 52 F.3d at 979. Its purpose is to translate the claim language “into plain English so that a jury will understand.” *Control Res., Inc. v. Delta Elecs., Inc.*, 133 F. Supp. 2d 121, 127 (D. Mass. 2001).

A claim term is generally given its plain and ordinary and customary meaning as the term would have been understood by a person of ordinary skill in the art at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005). Claims should be construed to preserve patent validity unless a contrary construction is the "only claim construction that is consistent with the claim's language and the written description." *Marine Polymer Techs., Inc. v. HemCon, Inc*., 672 F.3d 1350, 1368 (Fed. Cir. 2012) (quoting *Rhine v. Casio, Inc*., 183 F.3d 1342, 1345 (Fed. Cir. 1999)).

"Claim construction is not an obligatory exercise in redundancy" and "district courts are not (and should not be) required to construe every limitation present in a patent's asserted claims." *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008). Rather, claim construction is necessary only in limited situations, such as where a patentee has provided an alternate definition for a term, where the patentee has disclaimed subject matter or highlighted a feature as important to the invention, or where the term makes the scope so unclear as to require further clarification. *W.E. Hall Co. v. Atlanta Corrugating, LLC*, 370 F.3d 1343, 1353 (Fed. Cir. 2004); *see also Image Processing Techs., LLC v. Samsung Elecs. Co.*, No. 2:16-CV-505, 2017 WL 2672616, at *9 (E.D. Tex. June 21, 2017) ("The Court is not convinced that Defendant's constructions are necessary or appropriate based on the intrinsic record.").

The "intrinsic evidence of record, *i.e.*, the patent itself, including the claims, the specification and, if in evidence, the prosecution history," is "the most significant source of the legally operative meaning of [the] disputed claim language." *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). Claim construction always begins with the language of the claims themselves. *Id.* A construction that excludes a preferred embodiment from the scope of the claims is "rarely, if ever, correct." *Vitronics*, 90 F.3d at 1583. If necessary to determine the

meaning of a claim term, a court may also rely on extrinsic evidence, so long as such evidence is not used to "vary or contradict the terms of the claims." *Markman*, 52 F.3d at 980. Such evidence "may be helpful to explain scientific principles, the meaning of technical terms, and terms of art that appear in the patent and prosecution history." *Id.*

B. Indefiniteness

Under 35 U.S.C. § 112 ¶ 2, a "patent is invalid for indefiniteness if its claims, read in light of the patent's specification and prosecution history, fail to inform, with ***reasonable certainty***, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2123 (2014) (emphasis added). Absolute certainty or precision is not required. *Id.* at 2128 ("Some modicum of uncertainty . . . is the price of ensuring the appropriate incentives for innovation.'"). Thus, a "patentee need not define his invention with mathematical precision in order to comply with the definiteness requirement." *Sonix Tech. Co. v. Publications Int'l, Ltd.*, 844 F.3d 1370, 1377 (Fed. Cir. 2017). An alleged infringer bears the burden of showing "by clear and convincing evidence that a skilled artisan could not discern the boundaries of the claim based on the claim language, the specification, and the prosecution history, as well as her knowledge of the relevant art area." *Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1249-50 (Fed. Cir. 2008); *see also Effective Expl., LLC v. Bluestone Nat. Res. II, LLC*, No. 216CV00607JRGRSP, 2017 WL 3193322, at *8 (E.D. Tex. July 27, 2017) (holding same).

III. DISPUTED TERMS FROM THE '438 PATENT

A. "utilizing a comparison to compare the first signal set with the second signal set"

Claim	CyWee's Construction	Samsung's Construction
1	"determining or assessing differences based on a previous state associated with the first signal set and a measured state associated with the second signal set while calculating deviation angles"	Indefinite

1. Background and Legal Standard

CyWee proposed a construction for this term solely in response to Samsung's allegation that the term is indefinite. CyWee is not required to propose a construction for this term, and the Court need not adopt CyWee's construction to deny Samsung's indefiniteness argument. *Gonzalez v. Infostream Grp., Inc*., No. 2:14-CV-906-JRG-RSP, 2015 WL 5604448, at *12 (E.D. Tex. Sept. 21, 2015) ("the Court rejects Defendants' indefiniteness argument and determines that the terms have their ***plain and ordinary meaning*** . . . .") . Samsung cannot satisfy its burden of proving indefiniteness by clear and convincing evidence because, a person of ordinary skill in the art would understand with reasonable certainty the scope of this term. *E.g.* Declaration of Joseph LaViola ("LaViola Dec.") ¶ 17.[1] [2]

2. CyWee's Construction is Consistent with Claim 1, the Specification, and the Understanding of a Person of Ordinary Skill in the Art

This claim term refers to the first signal set and second signal set. Specially, a ***rotation sensor*** is used to detect and generate the ***first signal set***, which comprises ***angular velocities*** ωx, ωy, ωz. '438 patent claim 1. An ***accelerometer*** is used to detect and generate the ***second signal set***, which comprises ***axial accelerations*** Ax, Ay, and Az. *Id.*

[1] On January 31, 2018, the parties stipulated that with either party's claim construction brief(s), that party may serve expert declarations responsive to (1) the other party's expert declaration(s), (2) deposition testimony of the other party's expert(s), and/or (3) arguments made by the other party in its brief(s), and further that with either party's claim construction brief(s), that party may modify its original declaration in response to the other party's declaration(s), expert deposition testimony, and/or arguments. The parties also stipulated that each expert may be deposed once, but either party may raise deposition testimony at the claim construction hearing, even if not cited in a brief. This is consistent with the Court's Order (Dkt. 34), which includes the parties' prior stipulation that the deadline for claim construction discovery "does not apply to depositions taken following expert declarations and responsive expert declarations submitted during claim construction briefing."

[2] CyWee submitted Dr. LaViola's original declaration with the parties' joint claim construction statement on January 12, 2018. Dkt. 57-1. Samsung did not submit a declaration at that time, and instead served a responsive declaration by its expert, Dr. M. Ray Mercer ("Mercer Dec.," Ex. C) on January 26, 2018.

This claim term recites a comparison. As Dr. LaViola states, a ***comparison*** of two values in mathematics and computer science generally refers to ***determining or assessing differences*** between values as required by CyWee's construction. LaViola Dec. ¶ 18. This determination may be made by determining whether they are equal or not, or by the amount by which the two values differ. *Id.* This understanding is reflected in CyWee's construction, which recites "determining or assessing differences."

The specification states that the term "comparison" has a special meaning: "The term of 'comparison' of the present invention may generally refer to the ***calculating and obtaining of the actual deviation angles*** of the 3D pointing device . . ." '438 patent 2:27-29. The patent repeatedly refers to this comparison as an "enhanced comparison method." *E.g., id.* 3:62-63, 4:31-42 ("the present invention provides an enhanced comparison method . . . by comparing signals of rotation sensor related to angular velocities or rates with the ones of accelerometer related to axial accelerations"), 4:53-59. Thus, CyWee's construction requires that differences are determined or assessed "while calculating deviation angles," which is consistent with well-established Federal Circuit precedent holding that a patentee can act as a lexicographer. *E.g., Baxter Healthcare Corp. v. Mylan Labs. Ltd*., No. CV 14-7094 (JBS/JS), 2016 WL 1337279, at *5 (D.N.J. Apr. 5, 2016) (compiling list of Federal Circuit cases).

CyWee's construction requires determining or assessing differences based on "***previous state associated with the first signal set*** and a ***measured state associated with the second signal set***." (emphases added). This is consistent with claim 1, which states that the "***comparison*** . . . comprises an update program to obtain an updated state ***based on a previous state associated with said first signal set*** and a ***measured state associated with said second signal set***."

(emphases added); *see also Vitronics Corp. v. Conceptronic, Inc*., 90 F.3d 1576, 1582 (Fed. Cir. 1996) (holding that construction always begins with the language of the claims themselves).

3. Response to Dr. Mercer's Testimony

Dr. Mercer argues that this term is indefinite for three reasons. None of them are sufficient to prove indefiniteness by clear and convincing evidence. First, he argues that the term "axial accelerations" is ambiguous and indefinite because there are multiple types of acceleration. Ex. C ¶¶ 70-74, 117 ("A POSA could not determine the specific scope of any claims that include this term."). The term "axial accelerations" itself appears nowhere in this claim term or in CyWee's construction. And Dr. Mercer's allegation is at odds with the fact that Samsung does not allege that the term "axial acceleration"—which appears in ***every*** asserted independent claim in the '438 patent (1, 14, and 19)—is indefinite. Samsung had no problem understanding this term when it agreed that the following term from claim 1: "the measured stated includes a measurement of said second signal set and a predicted measurement . . ." may be construed as "the measured state includes a measurement of ***axial accelerations*** and predicted ***axial accelerations*** . . ." Dkt. 57 at 2. Samsung also conceded its understanding of this term when it agreed that the following term from claims 14 and 19: "calculating predicted ***axial accelerations*** Ax', Ay', Az' . . ." has its plain and ordinary meaning. *Id.* at 1 (emphasis added).

The '438 patent readily acknowledges that there are different types of acceleration, which may be read by an accelerometer, and that not all of those accelerations are desirable:

> [T]he reading of the accelerometer may be accurate only when the pointing device is static since due to the limitation on known accelerometers that these sensors may not distinguish the gravitational acceleration from the acceleration of the forces including centrifugal forces or other types of additional accelerations . . . .

'438 patent 3:9-15. Dr. Mercer's allegation that there are different types of acceleration misses the point. The '438 patent recognizes limitations of individual sensors and attempts to minimize

them by fusing data from multiple sensors (i.e. an accelerometer and gyroscope) over time using an enhanced comparison method to minimize errors and/or unwanted readings. *E.g., id.* 3:62-66 (describing "enhanced comparison method applicable to the processing of signals of motion sensors so that errors and/or noises . . . may be corrected or eliminated."), 5:2-8. A person of ordinary skill in the art would readily understand this concept. LaViola Dec. ¶ 33.

Dr. Mercer also argues that some of the measured accelerations may be non-straight "(since the structures imposing the centrifugal accelerations are not necessarily a rigid body)." Ex. C ¶ 66. Dr. Mercer's allegation is not credible. Figures 3, 5, and 6 show different embodiments of the invention, and Figure 1 shows related art. Each displays a rigid pointing device.

Second, Dr. Mercer argues that it would be impossible to correctly decompose different types of acceleration from an accelerometer. Ex. C ¶ 77. The ability to decompose a given accelerometer reading is not necessary when using the enhanced comparison method described and claimed by the '438 patent. LaViola Dec. ¶ 34. As discussed above, the patent discloses utilizing sensor fusion to minimize errors and/or unwanted readings.

Third, Dr. Mercer alleges it would be ***mathematically impossible*** to compare angular velocities with axial accelerations. This contention was rejected by the Northern District of California in *CyWee Group Ltd. v. Apple Inc.*, No. 14-cv-01853-HSG. Ex. D at 8. That court rejected the same argument Samsung makes here, and held that it "depends on an ***overly rigid construction*** of the term 'signal sets' as ***raw data*** from the signal sets.'" Ex. D at 8. (emphases added). The court further held that, while the comparison may be based on raw data, the raw data itself need not be compared:

> That two measurements are made using different units does not make it "***mathematically impossible***" to compare those measurements: Celsius may be converted to Fahrenheit, kilometers may be converted to miles, and grams may be converted to cups. So long as the '438 Patent informs a person having ordinary skill in the art "with reasonable

> certainty" how to compare the signal sets, the claim term is not indefinite. And the Patent does so by explicitly defining "comparison" as the calculation of "deviation angles," which calculation is described in further detail in the specification. *See, e.g.*, '438 Patent 10:53-15:7. The specification also describes how those deviation angles may be used to compare the signal sets-for example, through the use of quaternions.

Id. Dr. LaViola confirms that a direct comparison is not required. LaViola Dec. ¶ 21.

Instead, as described previously, the specification describes an enhanced comparison method and explicitly defines the term "comparison" to "generally refer to the calculating and obtaining of the actual deviation angles of the 3D pointing device . . ." *E.g.,* '438 patent 2:27-29. A person of ordinary skill in the art would understand that the comparison refers to the enhanced comparison method, which in turn refers to an extended Kalman filter ("EKF"), which is described and claimed in the '438 patent. LaViola Dec. ¶ 34, 41-42. "The EKF is a set of mathematical equations that use an underlying process model to estimate the current state of a system and then corrects the estimate using available sensor measurements." *Id.* ¶ 42. The patent does not require a direct comparison between angular velocities and axial accelerations. Because they differ, they are converted to a ***common state***. *Id.* ¶ 21. For example, in the embodiment of Figure 7, the previous state (first quaternion) is updated using angular velocities (first signal set) to generate a second quaternion. '438 patent Fig. 7, 11:2-4; *see also id.* The second quaternion is used to generate predicted axial accelerations (predicted state), which are compared to the measured accelerations (measured state or second signal set). LaViola Dec. ¶ 21.

Dr. LaViola further testifies that Equations 5-11 teach an extended Kalman filter to "ensure that a comparison between the angular velocities and axial accelerations can be compared by creating a common state that ensures the comparison is done properly." LaViola Dec. ¶¶ 21-22, 39-45. Dr. LaViola refutes Dr. Mercer's testimony, in which Dr. Mercer argues that the patent does not include several low-level details on these functions. A "patent need not teach, and

preferably omits, what is well known in the art." *Epistar Corp. v. Int'l Trade Comm 'n*, 566 F.3d 1321, 1336 (Fed. Cir. 2009); *Stragent, LLC v. Amazon.com, Inc*., No. 6:10CV225 LED-JDL, 2011 WL 13152568, at *4 (E.D. Tex. June 27, 2011) ("because the term 'engine' is understood to be a software program, § 112 ¶ 6 does not apply and the term is not indefinite."). Specifically, regarding Equation 6, in response to Dr. Mercer's allegation that it is not clear how Q_t is obtained, Dr. LaViola testifies that a person of ordinary skill in the art would recognize that this variable represents process noise, and would know that this variable can be obtained in a number of ways. LaViola Dec. ¶ 43. Dr. LaViola further testifies that a person would understand that $P(x_t|x_{t-1}, u_t)$, $P(x_{t-1}|x_{t-1})$, and $P(u_{t-1}|u_{t-1})$ all refer to the covariance matrix associated with the process model defined in Equation 2. Dr. Mercer alleges that Equation 9 is not adequately described. Ex. C ¶ 126. But a person of ordinary skill in the art would readily understand that R_t is the measurement noise associated with the measurement model, which can be obtained in a variety of ways, and $P(z_t|x_t)$ and $P(x_t|x_{t-1})$ all refer to the covariance matrix associated with the measurement model defined in Equation 8. LaViola Dec. ¶ 44. Finally, in response to Dr. Mercer's allegations regarding Equation 11, Dr. LaViola testifies that a person of ordinary skill in the art would understand that this equation represents the fusion component of the EKF that combines process and measurement models. *Id.* ¶ 45. Accordingly, this term is not indefinite because a person or ordinary skill in the art could determine its scope with reasonable certainty.

B. "comparing the second quaternion in relation to the measured angular velocities ωx, ωy, ωz of the current state at current time T with the measured axial accelerations Ax, Ay, Az and the predicted axial accelerations Ax', Ay', Az' also at current time T"

Claims	CyWee's Construction	Samsung's Construction
14, 19	This term need not be construed. In the alternative, this term may be construed as: "utilizing the second quaternion obtained from the measured angular velocities ωx, ωy, ωz of the current state at current time T, the measured axial accelerations Ax, Ay, Az, and the predicted axial accelerations Ax′, Ay′, Az′ also at current time T to obtain an updated state or updated quaternion."[3]	Indefinite

As discussed below and as confirmed by Dr. LaViola (*See* LaViola Dec. ¶¶ 46-66), Samsung fails to show, by clear and convincing evidence, that a person of ordinary skill in the art would not understand the scope of this term with reasonable certainty.

1. CyWee's Construction is Consistent with Claims 14 and 19, the Specification, and the Understanding of a Person of Ordinary Skill in the Art

As with the term discussed in § III.A herein, this claim recites a ***comparison***, and many of the arguments cited in that section apply here. Specifically, the '438 patent describes an enhanced comparison method, and states that such a comparison may generally refer to calculating and obtaining deviation angles. '438 patent 2:27-29, 4:53-59. Figures 7 and 8 are flowcharts that illustrate a sensor fusion algorithm and enhanced comparison method such as that used in claims 14 and 19. LaViola Dec. ¶ 47. Figures 7 and 8 describe the use of three quaternions as part of the enhanced comparison method. A person of ordinary skill in the art would recognize that these quaternions are utilized along with an extended Kalman filter (EKF). *Id* ¶ 47. Figures 7 and 8 illustrate an iterative process or loop in which the comparison method is repeated over time.

[3] The parties' Joint Claim Construction Chart & Prehearing Statement erroneously states that, if construed, this term may be construed as originally worded. Dr. LaViola's original declaration, attached to the parties' Joint Statement correctly provides CyWee's alternate construction listed above. Dkt. 57-1 ¶ 23. In response, Dr. Mercer submitted a declaration addressing the latter construction. Ex. C ¶ 152.

The 1st quaternion (shown in Figures 7 and 8) represents orientation at previous time T-1, which may be initialized the first time through the loop. '438 patent Fig. 7 Step 705, 11:62-64. On subsequent iterations of the loop, the 1st quaternion is sourced from an updated quaternion (the 3rd quaternion).

The ***second quaternion*** is computed using the ***angular velocities ω_x, ω_y, ω_z originating from the rotation sensor*** (comprising one or more gyroscopes) at current time T ('438 patent 7:64-65, 9:16-17, 12:32-38) and the first quaternion described above. This understanding is reflected in CyWee's construction, which recites "the second quaternion obtained from the measured angular velocities ω_x, ω_y, ω_z of the current state at current time T" and is consistent with claims 14 and 19 themselves, which recite "the second quaternion in relation to the measured angular velocities ω_x, ω_y, ω_z of the current state at current time T." The '438 patent further illustrates this step through the use of Equation 1, which is used to compute the second quaternion as shown as step 720 in Figures 7 and 8. LaViola Dec. ¶ 49. *See* '438 patent 12:40-60 (describing Equation 1).

The measured axial accelerations Ax, Ay, Az originate from the accelerometer or accelerometers at current time T. *Id.* Fig. 7 Step 725, 5:27-31; LaViola Dec. ¶ 50. The predicted axial accelerations are calculated at current time T. '438 patent Fig. 7 Step 730. Figures 7 and 8 disclose that the ***second quaternion*** (from Step 720), ***measured axial accelerations*** (from Step 725), and ***predicted axial accelerations*** (from step 730) are used to obtain an updated state or updated quaternion (referred to as a 3rd quaternion in Step 735). Similarly, this term requires "comparing the ***second quaternion*** . . . with the ***measured axial accelerations*** . . . and ***predicted axial accelerations***. These components are included in CyWee's construction.

2. Response to Dr. Mercer's Testimony

As with the prior term, Dr. Mercer argues that this term is indefinite for the following three reasons: (1) Dr. Mercer alleges that the term "axial accelerations" is ambiguous, (2) Dr. Mercer alleges that it would be impossible to decompose different types of acceleration from an accelerometer, and (3) Dr. Mercer alleges that it would be impossible to combine angular velocities with axial accelerations. Each of these arguments is readily refuted in CyWee's argument related to the preceding term and is further confirmed by Dr. LaViola. *See* LaViola Dec. ¶¶ 57-60.

As a fourth reason, Dr. Mercer argues that the term "predicted axial acceleration" is ambiguous for the same reasons that "axial accelerations are ambiguous." Ex. C ¶¶ 139-145. Thus, CyWee's arguments for the prior term refuting Dr. Mercer's testimony regarding "axial accelerations" applies equally here. *See also* LaViola Dec. ¶ 59. Further, Samsung had no problem understanding the term "predicted axial accelerations" when it agreed that the following term: "the measured stated includes a measurement of said second signal set and a predicted measurement . . ." may be construed as "the measured state includes a measurement of ***predicted axial accelerations*** . . ." Dkt. 57 at 2 (emphasis added). Samsung also had no problem understanding this term when it agreed that the following term from claims 14 and 19: "calculating predicted ***axial accelerations*** Ax', Ay', Az' . . ." has its plain and ordinary meaning. *Id.* at 1 (emphasis added).

C. "three-dimensional (3D) pointing device"/"3D pointing device"

Claims	CyWee's Construction	Samsung's Construction
1, 3, 4, 5, 14, 15, 16, 17, 19	This term need not be construed. In the alternative, this term may be construed as: "a handheld device that uses at least a rotation sensor comprising one or more gyroscopes, and one or more accelerometers to	"a device that detects the motion of the device in three-dimensions and translates the detected motions to control the

	determine deviation angles or the orientation of a device."	movement of a cursor or pointer on a display"

This term[4] need not be construed because its meaning would be clear to a person of ordinary skill in the art. *See* LaViola Dec. ¶ 67; *see also O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008). If the Court determines that construction is necessary, this term may properly be construed as proposed by CyWee.

Claim construction begins with the language of the claims themselves. *Vitronics*, 90 F.3d at 1582. Claim 1 explicitly requires "a ***rotation sensor*** for detecting and generating a first signal set comprising ***angular velocities*** ω_x, ω_y, ω_z." (emphasis added). Consistent with CyWee's construction, the specification states that the rotation sensor can include more than one gyroscope: "the abovementioned ***rotation sensor may comprise three gyroscopes*** corresponding to each of the said angular velocities of ω_x, ω_y, ω_z in a 3D spatial pointer reference frame of the 3D pointing device." '438 patent 5:24-26 (emphasis added).

Claim 1 also explicitly requires "an accelerometer for detecting and generating a second signal set comprising ***axial accelerations Ax, Ay, Az***." (emphasis added). The specification states that the accelerometer can include multiple accelerometers; for example, the accelerometer may include three single-axis accelerometers. '438 patent 5:28-31.

Independent claims 14 and 19 do not include the terms "accelerometer" or "rotation sensor." But a person of ordinary skill in the art would understand those claims to require one or more accelerometers due to the claim requirement "obtaining measured ***axial accelerations*** Ax, Ay, Az gained from the motion sensor signals of the six-axis motion sensor module . . . ." LaViola Dec. ¶ 69. And a person of ordinary skill in the art would understand those claims to require a

[4] These terms are referred to singularly for convenience as "3D pointing device."

rotation sensor comprising one or more gyroscopes because those claims require "obtaining measured ***angular velocities*** ω_x, ω_y, ω_z gained from the motion sensor signals . . . ." *Id.*

CyWee's construction provides additional guidance by requiring a ***handheld*** device. The specification repeatedly discloses such a device. Figures 3, 5, and 6 disclose embodiments of the present invention, and Figures 1 and 2 show related devices. All are handheld devices. *E.g.*, '438 patent (FIG. 1 is a "diagram showing a . . . handheld 3D pointing device . . .").

The specification repeatedly discloses that the handheld pointing device is for determining deviation angles or the orientation of the device as required by CyWee's construction. For example, the Abstract describes "A three-dimensional (3D) pointing device capable of accurately ***outputting a deviation*** . . . ." (emphasis added). Figures 7 and 8 provide flow charts of the patented invention. The last step in Figure 7 and the second-to-last step in Figure 8 is ***"[o]btain resultant deviation*** . . . ." (emphasis added). And embodiments of the invention similarly describe obtaining deviation angles. '438 patent 4:6-19, 4:65-5:3.

Samsung's proposed construction improperly adds the requirement that "detected motions . . . control the movement of a ***cursor or pointer on a display***." But none of the asserted claims (1, 3, 4, 5, 14, 15, 16, 17, or 19) require that a pointer or anything else be displayed. In contrast, claim 8, which depends from claim 1, may be read to require visual output, as it requires "translating said resultant angles . . . to a ***movement pattern*** in a display reference frame . . . ." (emphasis added). Inclusion of this limitation in claim 8 suggests that it is not required by the claims at issue here. *See Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004) ("[T]he presence of a dependent claim that adds a particular limitation raises a presumption that the limitation in question is not found in the independent claim."); *Wilson Sporting Goods Co. v. Hillerich & Bradsby Co.*, 442 F.3d 1322, 1329 (Fed. Cir. 2006) ("The

term 'rigid' appears in connection with 'insert' only . . . in uncontested claim 3 . . . . This . . . implies that the term 'insert,' when used elsewhere in the patent, does not inherently carry a 'rigid' limitation." *Wilson Sporting Goods Co. v. Hillerich & Bradsby Co.*, 442 F.3d 1322, 1329 (Fed. Cir. 2006).

The '438 patent discloses embodiments in which information need not be displayed. For example, Figure 7 discloses an embodiment "for obtaining a resulting deviation including resultant angles." Figure 8 is nearly identical, but additionally describes, in Step 750, translation of resultant angles to a movement pattern in the display reference frame. This strongly suggests that no display is required by the embodiment of Figure 7. Samsung's construction would improperly exclude embodiments such as Figure 7. *See Vitronics*, 90 F.3d at 1583 (holding that a construction that excludes a preferred embodiment is rarely if ever correct).

Other embodiments that require information to be displayed do not limit the displayed information to a "cursor or pointer" as suggested by Samsung. For example, the embodiment of Figure 8 "translate[s] the resultant angles to [a] ***movement pattern*** in the display reference frame." (emphasis added). The patent discloses another embodiment—shown in Figure 6—in which the display is integrated with the pointing device itself. When describing that embodiment, the specification uses permissive language and states that the computing processor ***may*** map the resulting deviation to a ***movement pattern*** appearing on the integrated display:

> The computing processor 648 of the processing and transmitting module 604 ***may too perform the mapping of resultant deviation*** from or in said spatial reference frame or 3D reference frame to a display reference frame such as a 2D reference frame . . . ***to a movement pattern in a display reference frame*** associated with the electronic device 600 itself. ***The display 682 displays the aforementioned movement pattern***.

Id. 10:29-39. Similarly, the embodiment disclosed in Figure 8 "translate[s] the resultant angles to ***movement pattern*** in the display reference frame." (emphasis added). In yet another

embodiment, the specification discloses that "a cursor ***or some video effect***" may be displayed. There is no requirement that the video effect be restricted to a "pointer" as Samsung's construction requires.

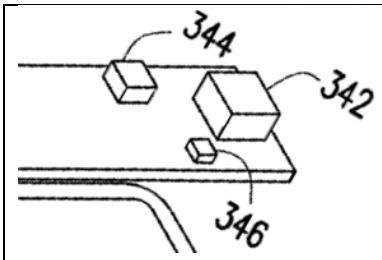
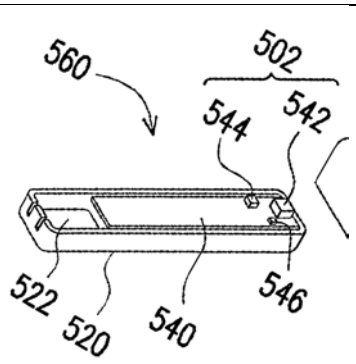
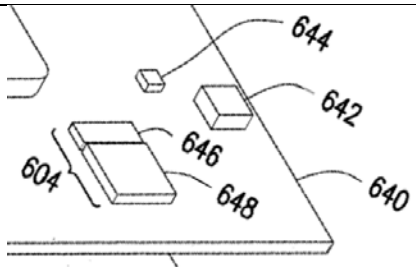
D. "six-axis motion sensor"/"six-axis motion sensor module"

Claims	CyWee's Construction	Samsung's Construction
1, 3, 4, 5, 14, 15, 16, 17, 19	This term need not be construed. In the alternative, this term may be construed as: "a collection of components comprising a rotation sensor comprising one or more gyroscopes for collectively generating three angular velocities and one or more accelerometers for collectively generating three axial accelerations where said gyroscope(s) and accelerometer(s) are mounted on a common PCB"	"a module consisting of two types of sensors: (i) a rotation sensor and (ii) one of more accelerometers"

This term need not be construed because its meaning would be understood by a person of ordinary skill in the art. *See* LaViola Dec. ¶¶ 74, 80; *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008) (a court need not construe every claim term). Although the parties previously proposed the term "six-axis motion sensor" they are really providing constructions for the full term "six-axis motion sensor ***module***." This is demonstrated by Defendants' unnecessary inclusion of the term "module" in their proposed construction. CyWee slightly modifies its proposed alternative construction to include the preface "a collection of components comprising," so that it is consistent with the patent's repeated use of the term "comprising," as discussed below.

Samsung's inclusion of the term "module" is likely to lead to confusion because it implies that the accelerometer[s] and rotation sensor cannot be separate or separated. But such a construction, which excludes a preferred embodiment is rarely, if ever, correct. *Vitronics*, 90 F.3d at 1583. Of the figures in the patent, only Figures 3, 5, and 6 show components for a six-

axis motion sensor as used in the present invention, and each is consistent with CyWee's proposed construction.

		
Excerpt from Figure 3	Excerpt from Figure 5	Excerpt from Figure 6

Each of these figures shows an accelerometer and gyroscope as ***separate*** components, separated by space on a common PCB, which may include additional components. Figure 3 includes "rotation sensor **342**" and "accelerometer **344**." '438 patent 7:47-48. Figure 5 includes "six-axis motion sensor module 502 comprising the rotation sensor **542** and an accelerometer **544**." *Id.* 9:13-14. And Figure 6 includes "rotation sensor **642**" and "accelerometer **644**." *Id.* Samsung's inclusion of the term "module" could be read to improperly exclude each of these embodiments.

Samsung's construction is also flawed because it allows for a motion sensor consisting of two types of sensors, and nothing more. Claim 1 explicitly requires a "six axis motion sensor module . . . comprising a rotation sensor . . . [and] an accelerometer . . ." The term "comprising" is open-ended and allows for the inclusion of additional elements. *CIAS, Inc. v. All. Gaming Corp.*, 504 F.3d 1356, 1360 (Fed. Cir. 2007); *CollegeNet, Inc. v. ApplyYourself, Inc.*, 418 F.3d 1225, 1235 (Fed. Cir. 2005). In contrast, Samsung's proposed term "consisting of" is close-ended and allows only the elements explicitly listed and no more. *CIAS*, 504 F.3d at 1361. The patentee's choice of the term "comprising" in the phrase "a six-axis motion sensor module . . . comprising" clearly allows for a six-axis motion sensor that includes additional components,

such as a processor or additional sensors. This reading is confirmed by the Abstract which describes "a six-axis motion sensor module ***including*** a rotation sensor and an accelerometer." (emphasis added). *See Lucent Techs., Inc. v. Gateway, Inc.*, 525 F.3d 1200, 1214 (Fed. Cir. 2008) (categorizing "including" as open-ended like "comprising"). The specification repeatedly uses open-ended phrases such as "comprises" or "includes" when describing a six-axis motion sensor. *E.g., id.* 5:18-23 ("the six-axis motion sensor module **comprises** a rotation sensor . . . and an accelerometer . . . ."), 10:24-25. The '438 patent also discloses a combination of motion sensors ***including*** accelerometers and gyroscopes:

> [T]he present invention provides an enhanced comparison method to eliminate the accumulated errors as well as noises over time associated with signals generated by a ***combination of motion sensors, including*** the ones generated by accelerometers Ax, Ay, Az and the ones generated by gyroscopes ωx, ωy, ωz in dynamic environments.

Id. 4:20-26 (emphases added). This disclosure plainly allows for additional components, and Samsung's close-ended construction is improper.[5]

IV. DISPUTED TERMS FROM THE '978 PATENT

A. "generating the orientation output based on the first signal set, the second signal set and the rotation output or based on the first signal set and the second signal set"

Claim	CyWee's Construction	Samsung's Construction
10	This term need not be construed. In the alternative, this term may be construed as: "generating the orientation/deviation angle output based on (1) the first signal set (from an accelerometer), the second signal set (from a magnetometer) and the rotation output (from a rotation sensor or gyroscope) or (2) the first signal set (from an accelerometer) and the second signal set (from a magnetometer)"	Indefinite

[5] Additionally, Samsung cites the file wrapper for the '978 patent as "intrinsic evidence" for this term. Samsung is incorrect. The intrinsic evidence for the '438 patent consists of its specification and file wrapper, and not the file wrapper for another patent. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1317 (Fed. Cir. 2005).

This term need not be construed and is not indefinite because a person of ordinary skill in the art would readily understand its scope with reasonable certainty. LaViola Dec. ¶ 86. Indeed, the plain and unambiguous language of the term speaks for itself—the orientation output is either based on a combination of the first signal set, the second signal set, and the rotation output, or it is simply based only on the first and second signal sets. Even a layperson would readily understand this. There is simply nothing here to construe, and the term need not be construed for the Court to hold that it is not indefinite. *Gonzalez*, 2015 WL 5604448, at *12.

CyWee's alternative construction is consistent with the claim language and other intrinsic evidence, as well as the understanding of a person of ordinary skill in the art. LaViola Dec. ¶¶ 86-107. Specifically, CyWee's construction requires a "first signal set (from an accelerometer)" consistent with claim 10's requirement of "generating a first signal set comprising axial accelerations associated with movements and rotations of the 3D pointing device in the spatial reference frame." CyWee's construction further requires a "second signal set (from a magnetometer)" consistent with claim 10's requirement of "generating a second signal set associated with Earth's magnetism." CyWee's construction recites a "rotation output (from a rotation sensor or gyroscope)" consistent with claim 10's requirement of a "rotation output" as well as the patent's teaching that a rotation sensor may include one or more gyroscopes. '978 patent 5:57-61. A person of ordinary skill in the art would further understand that the terms "rotation sensor" and gyroscope are interchangeable, and the function of either is to measure angular velocities. LaViola Dec. ¶ 88.

Additionally, in keeping with the plain language of the term being construed, CyWee's construction requires that orientation output is generated based on (1) the first signal set, second

signal set, and rotation output or (2) the first signal set and second signal set." In other words, the patented device may, optionally, use a gyroscope while determining orientation.

Finally, a person of ordinary skill in the art would understand the claimed "orientation output" to signify the angular position or "attitude" of the device. LaViola Dec. ¶ 89; *see also* '978 patent 7:57-61 ("The orientation sensor generates an orientation output associated with an orientation of the 3D pointing device associated with three coordinate axes of a global reference frame associated with the Earth."), 31:4-9 ("The computing processor 348 may generate the aforementioned orientation output in the form of a rotation matrix, a quaternion, a rotation vector, or in a form including the three orientation angles yaw, pitch and roll."). Accordingly, CyWee's construction requires generating "orientation/deviation angle output," which allows for generation of any of these outputs.

Dr. Mercer argues that this term is indefinite for the following three reasons: (1) he alleges that the term "axial accelerations" is ambiguous, (2) he alleges that it is impossible to decompose different types of accelerations from a reading, and (3) he alleges that it is mathematically impossible to generate an orientation output using axial accelerations and magnetisms without being able to separate components of acceleration. Ex. C ¶¶ 167-172.

Dr. Mercer's first and second reasons are misguided for reasons disclosed in § III.A.3 herein and below.[6] *See also* LaViola Dec. ¶¶ 98-99. Specifically, Dr. Mercer's argument contradicts Samsung's agreement and understanding that the term "axial acceleration" may properly be used in other terms and constructions. Dkt. 57 at 1-2. Dr. Mercer's allegation that there are different types of acceleration misses the point because the patent teaches that there are different types of

[6] For clarity, that section relates to the '438 patent. The specification of the '978 patent is nearly identical to that of the '438 patent. Several citations specific to the '978 patent are listed in this section.

acceleration and not all are desirable. ’978 patent 3:14-19 (discussing limitations). The ’978 patent further teaches an enhanced comparison method for fusing data from multiple sensors over time to minimize errors and/or unwanted readings. *E.g.*, *id.* 4:4-11 (“there is a need to provide an enhanced comparison method applicable to the processing of signals of motion sensors so that errors and/or noises . . . may be corrected or eliminated.”). Thus, the ability to decompose a given accelerator reading is not necessary when using this enhanced comparison method. LaViola Dec. ¶¶ 99-101.

Regarding Dr. Mercer’s third reason, he alleges that it is only possible to generate an orientation output based on axial accelerations and magnetism readings if axial accelerations are interpreted to be based solely on gravitational accelerations. Ex. C ¶ 173. If the device were stationary, the only acceleration measured would be gravitational acceleration. Dr. Mercer’s allegation misses the point because, as Dr. LaViola testifies, a person of ordinary skill in the art would understand that the enhanced comparison method of the ’978 patent is designed to eliminate noise and reduce errors when a device is ***moving***. LaViola Dec. ¶ 96. For example, the specification teaches that “in order calculate the resulting deviation, the computing processor 348 may utilize a comparison or algorithm to eliminate accumulated errors of the first, second and/or third signal sets of the nine-axis motion sensor module 302 . . . .” ’978 patent 10:64-67, 11:1. Thus, a person of ordinary skill in the art would understand that the claimed measured state could comprise measured data solely from the accelerometer and magnetometer to reduce or eliminate accumulated errors while moving the 3D pointing device.

B. "3D pointing device"

Claim	CyWee's Construction	Samsung's Construction
10	This term need not be construed. In the alternative, this term may be construed as: "a handheld device that includes at least one or more accelerometers and a magnetometer, and optionally a rotation sensor comprising one or more gyroscopes, and uses them to determine deviation angles or the orientation of a device"	"a device that detects the motion of the device in three-dimensions and translates the detected motions to control the movement of a cursor or pointer on a display"

This term need not be construed because its meaning would be readily understandable by a person of ordinary skill in the art. *See* LaViola Dec. ¶ 102; *see also O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008) (holding that a court need not construe every claim term).

In the event the Court determines that construction is necessary or useful, this term may properly be construed as proposed by CyWee. Unlike Samsung's proposed construction, CyWee's construction provides guidance regarding the elements of the 3D pointing device by requiring "at least a rotation sensor comprising one or more gyroscopes" and "one or more accelerometers."

Claim construction begins with the language of the claims themselves. *Vitronics*, 90 F.3d at 1582. Claim 10 requires a ***magnetometer*** through its requirement of "generating a second signal set associated with Earth's magnetism.". Claim 10 requires an ***accelerometer*** through its requirement of "generating a first and second signal set comprising axial accelerations associated with movements and rotations of the 3D pointing device." And Claim 10 requires a ***rotation sensor*** through its requirement of "generating a rotation output associated with a rotation of the 3D pointing device." The patent further states that the accelerometer may include multiple accelerometers and the rotation sensor may include multiple gyroscopes, as explicitly allowed for by CyWee's construction:

> It can be understood that in another embodiment, the abovementioned ***rotation sensor may comprise three gyroscopes*** corresponding to each of the said angular velocities of ωx, ωy, ωz in a 3D spatial reference frame of the 3D pointing device; whereas the abovementioned ***accelerometer may comprise three accelerometers*** corresponding to each of the said axial accelerations Ax, Ay, Az in a 3D spatial reference frame of the 3D pointing device . . . .
>
> '978 patent 5:57-5:64.

The specification repeatedly discloses a portable ***handheld*** device. More specifically, Figures 1 and 2 disclose prior art pointing devices, and Figures 3 and 5 disclose embodiments of the present invention. All are handheld devices. And the specification repeatedly states that it is directed to portable devices. *Id*. 1:29-31, ("FIG. 1 is a schematic diagram showing a user using a portable electronic device 110, such as a 3D pointing device . . . ."), 13:5-6 ("FIG. 6 is an exploded diagram showing a portable electronic device 600, such as for example a 3D pointing device . . . . examples of the portable electronic device 600 as an explanatory embodiment of the present invention may include such as smartphone, tablet PC or navigation equipment").

The specification repeatedly discloses that the pointing device is for determining deviation angles or the orientation of the device as required by CyWee's construction. For example, the Abstract describes "A three-dimensional (3D) pointing device capable of accurately ***outputting a deviation*** . . . ." (emphasis added). Figures 7 and 8 provide flow charts of the patented invention. The last step in Figure 7 and the second-to-last step in Figure 8 is "***[o]btain resultant deviation*** . . . ." (emphasis added). And the specification repeatedly discloses determining deviation angles. *E.g.* '978 patent 4:15-26 ("According the one aspect of an example embodiment of the present invention . . . such that ***resulting deviation including resultant angles*** . . . of the 3D pointing device subject to movements and rotations in dynamic environments ***may be obtained*** . . . .), 5:31-35 ("In other words, the present invention is capable of accurately ***outputting the***

abovementioned deviation angles . . . to eliminate or reduce accumulated errors and noises . . . .") (emphases added).

Samsung's proposed construction improperly adds the requirement that "detected motions . . . control the movement of a ***cursor or pointer on a display***." Claim 10 already requires a "transformed output," which relates to visual output and is being construed separately. *See* § 4.D. Because the term "transformed output" already addresses displayed information, that displayed information need not be construed as part of the term "3D pointing device."

Further, several embodiments explicitly require that a "movement pattern" is displayed, but do not require that the movement pattern be specifically limited to a cursor or pointer. For example, the patent discloses an embodiment in which the display is integrated with the pointing device itself. '978 patent Fig. 6. The specification states merely that the computing processor may map the resulting deviation to a ***movement pattern*** appearing on the display, but there is no requirement that the movement pattern include a "cursor or pointer."

> The computing processor 648 of the processing and transmitting module 604 ***may too perform the mapping of resultant deviation*** from or in said spatial reference frame or 3D reference frame to a display reference frame such as a 2D reference frame by translating the resultant angles of the resulting deviation of the electronic device 600 in the spatial reference frame, preferably about each of three orthogonal coordinate axes of the spatial reference frame ***to a movement pattern in a display reference frame*** associated with the electronic device 600 itself. ***The display 682 displays the aforementioned movement pattern***.

Id. 13:48-58 (emphases added). Similarly, Figure 8 discloses an embodiment of a 3D pointing device that "translate[s] the resultant angles to ***movement pattern*** in the display reference frame." (emphasis added). Further the specification clearly discloses that a cursor may but need not be displayed in other embodiments. Id. 21:61-63 ("The display device ***may display a cursor or some video effect*** on the display screen 910 to highlight the position of the target point 924."), 32:2-3 ("the display device may be controlled to move a ***virtual object*** or ***a cursor*** along the

movement pattern."). There is no requirement that the "video effect" or "virtual object" mentioned above be limited to a "pointer," as Samsung's construction would require.

C. "global reference frame associated with Earth"

Claim	CyWee's Construction	Samsung's Construction
10	This term need not be construed. In the alternative, this term may be construed as: "reference frame with axes defined with respect to Earth"	"an Earth-centered coordinate system with an origin and a set of three coordinate axes defined with respect to Earth"

This term need not be construed because, as CyWee's expert Dr. LaViola testified, a person of ordinary skill in the art would readily understand the scope of the claim term to have its plain and ordinary meaning. LaViola Dec. ¶ 108; *see also O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008) (holding that a court need not construe every claim term).

Samsung's construction is overly narrow because it is "Earth-centered." LaViola Dec. ¶ 109. "Earth-Centered" coordinate systems or reference frames refer to systems with their origin at the center of the earth. *Id.*; *see also* Ex. E § 2.2.1. For example, an "Earth-Centered Inertial Frame" has its origin at the center of the Earth, with the z-axis oriented through the North Pole, and the x-axis oriented through the equator and fixed with respect to an astronomical body, such as the vernal equinox or center of the sun. Ex. E § 2.2.1. Hence the frame does not rotate with the Earth. *Id.*; LaViola Dec. ¶ 109. An "Earth-Centered Earth-Fixed Frame" has its origin in the center of the Earth, with the z-axis is oriented through the North Pole, and the x-axis oriented through the equator at a specific longitude. Ex. E § 2.2.2.

Several reference frames tied to the Earth are not "Earth-Centered." LaViola Dec. ¶ 64. For example, an Earth-based frame may have its origin at or near the surface of the Earth instead of its center. Ex. E § 2.2.2; LaViola Dec. ¶ 64. An example of this is the ENU (East-North-Up)

frame, in which the origin may coincide with the center of the sensor, the y-axis points North, the x-axis points East, and the z-axis points up. Ex. E § 2.2.2; LaViola Dec. ¶ 110. Samsung's construction would exclude such a frame, because the origin is not at the center of the Earth.

Here, the specification itself does not define the term "global reference frame" but states that such a frame includes ***three coordinate axes*** that must simply be ***associated with*** the Earth. '978 patent 7:57-61 ("The orientation sensor generates an orientation output associated with an orientation of the 3D pointing device associated with ***three coordinate axes of a global reference frame associated with the Earth***.") (emphases added); *see also id.* 8:3-10.

The '978 patent does not refer to an "Earth-Centered" frame at all, and it includes no disclaimer or disavowal showing that the global reference frame must have its origin at the center of the Earth, and that other Earth-based frames must be excluded. Samsung's construction is a thinly-veiled attempt to avoid a finding of infringement and should be rejected.

D. "using the orientation output and the rotation output to generate a transformed output associated with a fixed reference frame associated with a display device"

Claims	CyWee's Construction	Samsung's Construction
10	"using the orientation output and the rotation output to generate a transformed output ***represented by*** 2-dimensional movement in a fixed reference frame that is parallel to the screen of a display device"	"using the orientation output and the rotation output to generate a transformed output ***representing a*** two-dimensional movement in a fixed reference frame that is parallel to the screen of the display device"

The parties' constructions for this term are nearly identical in wording, but differ significantly in scope. Regarding similarities, the language proposed by both parties aligns with intrinsic evidence confirming that the transformed output represents ***movement***. For example, Figure 8 discloses an embodiment of a 3D pointing device that "translate[s] the resultant angles to ***movement pattern*** in the display reference frame." (emphasis added). Figure 6 discloses an

embodiment in which the pointing device and display are integrated. In this embodiment, the computing processor may map the resulting deviation to a ***movement pattern***.

> The computing processor 648 of the processing and transmitting module 604 ***may too perform the mapping of resultant deviation*** from or in said spatial reference frame or 3D reference frame to a display reference frame such as a 2D reference frame by translating the resultant angles of the resulting deviation of the electronic device 600 in the spatial reference frame, preferably about each of three orthogonal coordinate axes of the spatial reference frame ***to a movement pattern in a display reference frame*** associated with the electronic device 600 itself. ***The display 682 displays the aforementioned movement pattern***.

'978 patent 13:48-59.

CyWee's construction requires that the transformed output is ***represented by*** a two-dimensional movement, while Samsung's construction requires that the transformed output ***represents a*** two-dimensional movement. Samsung's construction is overly narrow because it suggests that the transformed output cannot represent three-dimensional movement. CyWee expects Samsung to rely on a single embodiment, in which "[t]he transformed output $<d_x, d_y>$ ***represents a*** 2-dimensional movement in a display plane . . . ." '978 patent 31:58-65 (emphasis added). In that embodiment, the pointer and pointing device are separate. *See id.* Applying this limitation to ***all embodiments*** is improper and contrary to the teachings of the '978 patent.

Specifically, the '978 patent itself teaches tracking of movement in three dimensions rather than two dimensions. For example, claim 10 requires a 9-axis motion sensor, and teaches the use of an accelerometer, gyroscope, and magnetometer, each having the capability of providing 3-axis (rather than 2-axis) output. Thus, any representation of that movement on a 2-dimensional screen (such as the screens disclosed in Figures 2 and 6) is a 2-dimensional representation of movement, which may occur in three dimensions. Unlike the embodiment described in the previous paragraph which requires a separate pointing device and display, Figure 6 shows an embodiment in which the 3D pointing device and screen are combined into a single device. The

description of this embodiment explicitly states that the display may show a movement pattern associated with 3D movement (about three axes, not two):

> [t]he computing processor . . . may too perform the mapping of resultant deviation . . . to a display reference frame such as a 3D reference frame by translating the resultant angles of the resulting deviation of the electronic device . . . preferably about each of ***three orthogonal coordinate axes*** of the spatial reference frame to a movement pattern in a display reference frame associated with the electronic device **600** itself. The display **682** displays the aforementioned movement pattern.
> 13:48-58. (emphases added).

Samsung's construction could be read to exclude this embodiment in violation of well-established law holding that a construction that excludes a preferred embodiment from the scope of the claims is "rarely, if ever, correct." *Vitronics* ,90 F.3d at 1583.

The patent includes other broad disclosures regarding the scope of the transformed output. For example, the Abstract states "The computing processor uses the orientation output and the rotation output to generate a transformed output associated with a fixed reference frame associated with the display device. ***The transformed output represents a segment of the movement pattern***." (emphasis added). In one embodiment, "the orientation output and the rotation output" are used "to generate a ***transformed output associated with a fixed reference frame associated with a display device***." *Id.* 8:10-12. Yet another embodiment discloses that "based on the deviation angles being compensated and accurately outputted in a ***3D spatial reference frame*** may be further ***mapped onto*** or translated into another reference frame, for example ***a reference in two-dimension (2D)***." *Id.* 43-45. In other words, in this embodiment, 3D movement is translated to 2D output. This embodiment does not require that such output solely represents 2D movement, as Samsung's construction requires.

Samsung's reliance on a single embodiment to narrow the scope of claim 10 violates well-established Federal Circuit precedent holding that disclaimer or disavowal of subject matter must

be clear. *Retractable Techs., Inc. v. Becton, Dickinson & Co.*, 653 F.3d 1296, 1306 (Fed. Cir. 2011) ("Nothing in the claim language indicates that the claims exclude 'cutting' as a matter of law. To disavow claim scope, the specification must contain '***expressions of manifest exclusion or restriction***, representing a ***clear disavowal*** of claim scope.'"). Accordingly, CyWee respectfully requests that the Court reject Samsung's overly-narrow construction of this term.

V. CONCLUSION

For the reasons stated herein, CyWee respectfully requests that the Court hold that Samsung has failed to prove by clear and convincing evidence that any terms are indefinite. CyWee further requests that the Court adopt CyWee's proposals regarding proper constructions for the disputed terms.

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Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned certifies that all counsel of record who are deemed to have consented to electronic service are being served with a copy of this document via the Court's CM/ECF system per Local Rule CV-5(a)(3) on February 23, 2018

/s/ *Ari Rafilson*
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